FARMER COOPERATIVE SERVICE
UNITED STATES DEPARTMENT OF AGRICULTURE
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ECONOMICS OF BALING AND STORING SEED COTTON FOR PROCESSING AT A CENTRAL GIN

by
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Marketing Division

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Joseph G. Knapp, Administrator

The Farmer Cooperative Service conducts research studies and service activities of assistance to farmers in connection with cooperatives engaged in marketing farm products, purchasing farm supplies, and supplying business services. The work of the Service relates to problems of management, organization, policies, merchandising, product quality, costs, efficiency, financing, and membership.

The Service publishes the results of such studies, confers and advises with officials of farmer cooperatives; and works with educational agencies, cooperatives, and others in the dissemination of information relating to cooperative principles and practices.

CONTENTS

ECONOMICS OF BALING AND STORING SEED COTTON FOR PROCESSING AT A CENTRAL GIN

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This report gives estimated costs of baling seed cotton at receiving stations, storing the baled seed cotton in warehouses at Lubbock, Texas, and ginning it later in a central gin. It also compares these costs with those of regular gins and includes a few comments on blending.

The Board of Directors of Plains Cotton Cooperative Association, Lubbock, Texas, requested that Farmer Cooperative Service make this study. Since the findings of the study have wide industry application, the report is being published as an FCS Service Report and is available upon request to anyone having a need for the information.

PURPOSE OF STUDY

Growers are harvesting most of their cotton in three weeks, especially where it is machine harvested. This means that often the cotton cannot be ginned as fast as it can be harvested. In the future, as more cotton is harvested by machines, problems created by the difference between harvesting rate and ginning capacity may become even more acute.

Many gins have attempted to meet this problem, at least in part, by such means as increasing capacity of gins and storing seed cotton in baskets or trailers and ginning it when time permits.

Another approach in helping to solve this problem is a new method being considered, that of baling or packaging seed cotton, in excess of

ginning capacity, as fast as it comes to the gin, and then ginning it later at a central gin.

The purpose of this study was (1) to develop estimated costs of handling cotton through receiving stations and of ginning it at a central gin, and (2) to compare these costs with the average cost of present gins. It was necessary to develop various combinations of equipment at receiving stations on which to base costs. This report then serves the additional purpose of providing alternative combinations of equipment for consideration in establishing such a system.

GINNING COSTS - PRESENT AND PROJECTED

Costs of ginning 6,000 bales a year on a modern $300,000 gin, in the Lubbock area, were estimated at $14.82 a bale, table 1. These estimates were based on a recent survey of 13 cooperatives, operating 24 gins in the vicinity of Lubbock, and on other data from that area. Items making up these estimated costs are shown in table 1.

Costs for a central gin with seven receiving stations were estimated at $9.82 a bale, including cost of using receiving stations. This cost, therefore, was $5.00 a bale less than that for a conventional gin.

Total fixed costs of the two gins were estimated to be equal at $30,720 a year. But, fixed cost per bale at the central gin was $4.27 lower than that at the single gin, $5.12 vs. $0.85, due to the larger volume.

Table 1.--Comparison of estimated ginning costs of present gin and for a projected central gin with receiving stations, Lubbock area of Texas, 1963.

Item	Single gin, 6,000 bales (usual practices)		Central gin, 36,000 bales (with 7 receiving stations)	
	Total for season	Cost per bale	Total for season	Cost per bale
Variable costs at gin:				
Manager's salary	$ 6,000	$ 1.00	$ 12,000	$ 0.33
Office salaries	3,300	0.55	19,800	0.55
Gin labor	21,900	3.65	57,600	1.60
Office supplies	1,200	0.20	7,200	0.20
Repairs and gin supplies	9,000	1.50	36,000	1.00
Power	9,900	1.65	36,000	1.00
Fuel and water	1,800	0.30	5,400	.15
Other	5,100	0.85	16,200	.45
Total variable	58,200	9.70	190,200	5.28
Fixed costs at gin:				
Depreciation	20,280	3.38	20,280	0.56
Interest on investment	7,740	1.29	7,740	0.21
Taxes, ad valorem	1,680	0.28	1,680	0.05
Insurance	1,020	0.17	1,020	0.03
Total fixed	30,720	5.12	30,720	0.85
Total cost at gin	88,920	14.82	220,920	6.13
Difference in gross costs per bale in favor of central gin	-	-	-	8.69
Reciving station costs:				
Estimated operating costs of 7 receiving stations	-	-	81,000	2.25
Interest on investment in 7 receiving stations 1/	-	-	7,000	0.19
Allowance estimated to cover other costs on cotton going through central gin 2/	-	-	44,640	1.25
Total ginning and receiving station cost	88,920	14.82	353,560	9.82
Net estimated difference in cost per bale in favor of central gin	-	-	-	5.00

1/ Receiving stations estimated to cost $40,000 each and 5 percent interest rate on one-half of estimated cost was used to compute interest.

2/ Other costs would include sampling, sample analysis, additional insurance and storage costs, wire or twine for hay baler packages of seed cotton and allowance for receiving station costs not covered by estimates.

Total variable costs per season at the single gin were estimated at $58,200 compared with $190,200 at the central gin, or $9.70 and $5.28 per bale, respectively. Most variable costs on a per-bale basis were estimated to decline with increases in volume at the central gin. Office supplies and office salaries were exceptions as each was the same at both gins. Manager's salary at the central gin was double that of the single, but on a per-unit basis it was only one-third as much.

Gin labor at the central gin was estimated at $1.60 compared with $3.65 a bale at the single gin. The lower rate at the central gin was based on these factors: (1) Continuous ginning without loss of time between bales of different customers--this would result in increased volume a day, perhaps by 20 percent; (2) idle time during bad weather would be eliminated, and (3) full use of labor would be possible because the gin should be operating at or near capacity. In a recent study it was found that less than 1 man-hour of labor per bale was used during peak weeks of operation compared with an average of 2.5 to 3.0 man-hours for the season.

Some reductions in cost of repairs and supplies a bale seems likely for a central gin compared to these costs for gins operated in the usual manner. The reduction was estimated at $0.50 a bale.

Power rates in Lubbock are more than $0.65 a bale lower than at many points in that area. Furthermore, centralized gins should be able to get reduced rates for continuous operation for 5 months or more. The estimated reduction in power cost, of $0.65 a bale, is probably too conservative.

Fuel, water, and other costs per bale would likely decline substantially on the larger volume of a central gin.

The difference between total ginning costs amounted to $8.69 a bale in favor of the central gin. But other costs would be involved for central gins using receiving stations that would not be applicable for a single gin.

For example, an estimated operating cost of $2.25 a bale was included in table 1 for receiving stations, which includes additional cost of hauling to Lubbock.

Interest on investments in receiving stations was included in table 1, for comparison of costs of single gin with central gin. Interest on investments was included on gins and receiving stations because of the difference in investments per bale in total facilities. Interest at 5 percent amounted to $0.19 a bale on seven receiving stations.

Other costs on cotton going through centralized gins were estimated to total $1.25 a bale. These include sampling, sample analysis, additional insurance and storage costs, wire or twine for hay baler packages of seed cotton, and allowance for other costs not covered.

EQUIPMENT AND COSTS OF SEED COTTON RECEIVING STATIONS

Items of equipment used in estimating the costs of receiving stations included conventional gin equipment, combination cleaner and unloaders, pneumatic unloaders, and hay balers. Price information on most of the equipment included in the study was furnished by Plains Cotton Cooperative Association, but that for some equipment was obtained from manufacturers and dealers. We estimated the costs of electric motors, starters, wiring, installation and related items. We also estimated the capacities of part of the equipment.

Seed cotton receiving stations could be designed to house a wide range and variety of equipment. For example, a combination of conventional equipment with other kinds of equipment may prove practical.

Cost of operating seed cotton receiving stations is presented in the following section of this report. After that, procedures used for finding costs are discussed.

Operating Costs of Receiving Stations

Costs of handling seed cotton at receiving stations could vary widely depending upon such factors as type and amount of equipment used, services performed, labor requirements, and distance from central gin.

Because of the possible variances among these factors, costs and other information for 12 receiving stations, with different capacity, investment, percentage of trash and burs extracted, or other variable, have been developed, table 2. These 12 are referred to as combination numbers.

Preceding table 2 is table 2a which shows the buildings and equipment items included in each combination.

Costs of handling seed cotton through these 12 receiving stations, plus additional expenses of hauling extra weight to Lubbock, were estimated to range from $1.23 to $5.13 per bale. The lowest cost was in Combination 12, when 18,000 bales a year were handled and the highest cost was in Combination 2, when 3,000 bales a year were handled.

Estimates in table 2 included costs of depreciation, taxes, insurance, repairs, electric power, labor, and cost of hauling the extra weight per bale. Expenses for sampling seed cotton, analysis of those samples, and losses on bagging and ties for gin press packages or cost of wire or twine

Table 2A.--Buildings and equipment systems included in selected combinations of seed cotton receiving stations.

Combination #1
- Standard gin unloader
- Rock catcher
- Airline cleaner
- Incline cleaner
- Bur machine, 14'
- Stick machine
- Feed control
- Gin press
- Building

Combination #2
- Standard gin unloader
- Rock catcher
- Feed control
- Gin press
- Building

Combination #3
- Standard gin unloader
- Rock catcher
- Boll opener cylinder
- Stick machine
- Feed control
- Gin press
- Building

Combination #4
- Standard gin unloader
- Rock catcher
- Incline cleaner
- Bur machine, 14'
- Feed control
- Gin press
- Building

Combination #5
- Standard gin unloader
- Rock catcher
- Airline cleaner
- Incline cleaner
- Bur machine, 14'
- Stick machine
- Feed control
- Hay baler, 16-ton size
- Building

Combination #6
- Standard gin unloader
- Rock catcher
- Feed control
- Hay baler, 16-ton size
- Building

Combination #7
- Standard gin unloader
- Rock catcher
- Boll opener cylinder
- Stick machine
- Feed control
- Hay baler, 16-ton size
- Building

Combination #8
- Standard gin unloader
- Rock catcher
- Incline cleaner
- Bur machine, 14'
- Feed control
- Hay baler, 16-ton size
- Building

Combination #9
- Combination cleaner and unloader, extra fan, motor, and separator
- Boll opening cylinder and stick machine
- Feed control
- Hay baler, 16-ton size
- Building

Combination #10
- Combination cleaner and unloader (large), extra motor, fan, and separator
- Two boll opening cylinders and 2 stick machines
- Feed control
- Hay baler, 20-ton size
- Building

Combination #11
- Pneumatic unloader
- Rock catcher
- Two boll opening cylinders and 2 stick machines
- Feed control
- Hay baler, 20-ton size
- Building

Combination #12
- Pneumatic unloader
- Two rock catchers
- Four boll opening cylinders and 4 stick machines
- Two feed controls
- Two 20-ton hay balers
- Building

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Table 2.--Capacity, investment, labor requirements, operating costs, and other related information for 12 selected combinations of equipment for seed cotton receiving stations, Lubbock area of Texaa, 1963. 1/

Item	Combination number											
	1	2	3	4	5	6	7	8	9	10	11	12
Capacity (bales per bour)	10	10	10	10	10	10	10	10	10	18	18	36
Investment	$63,688	$37,767	$43,986	$55,645	$44,429	$19,133	$24,207	$37,011	$28,053	$36,987	$31,519	$54,413
Labor requirements per shift (men)	5.5	4.5	5.0	5.0	3.5	2.5	3.0	3.0	3.0	2/3.0 or 4.0	2/3.0 or 4.0	3/3.0 to 5.5
Operating costs per bale by volumes (from tables 5, and 10 tbrough 15):												
3,000 bales	$4.46	$3.11	$3.52	$3.96	$3.05	$1.72	$2.11	$2.57	$2.24	$2.53	$2.30	$3.08
4,000 "	3.40	2.37	2.69	3.02	2.35	1.33	1.62	1.98	1.71	1.94	1.76	2.33
5,000 "	2.77	1.93	2.19	2.46	1.93	1.10	1.34	1.63	1.41	1.58	1.43	1.89
6,000 "	-	-	-	-	-	-	-	-	-	1.34	1.21	1.60
9,000 "	-	-	-	-	-	-	-	-	-	1.06	0.96	1.22
18,000 "	-	-	-	-	-	-	-	-	-	-	-	0.75
Estimated percentage of trasb and burs extracted (percent)	90	5	50	75	90	5	50	75	60	60	50	50
Weigbt of trasb and burs per bale (pounds)	850	850	850	850	850	850	850	850	850	850	850	850
Estimated weigbt per bale of trash and burs extracted (pounds)	765	42	425	638	765	42	425	638	510	510	425	425
Estimated weigbt per bale of trash and burs not extracted (pounds)	85	808	425	212	85	808	425	212	340	340	425	425
Costs per bale of bauling to Lubbock, trasb and burs not extracted:												
Range (@ 11.22¢ to 24.96¢ per cwt.)	$.10 - $.21	$.91 - $2.02	$.48 - $1.06	$.24 - $.53	$.10 - $.21	$.91 - $2.02	$.48 - $1.06	$.24 - $.53	$.38 - $.85	$.38 - $.85	$.48 - $1.06	$.48 - $1.06
Average (@ 17.78¢ per cwt.)	.15	1.44	.76	.38	.15	1.44	.76	.38	.60	.60	.76	.76
Range in total costs per bale by volumes delivered to Lubbock: 4/												
3,000 bales	$4.56-$4.67	$4.02-$5.13	$4.00-$4.68	$4.20-$4.49	$3.15-$3.26	$2.63-$3.74	$2.59-$3.17	$2.81-$3.10	$2.62-$3.09	$2.91-$3.38	$2.78-$3.36	$3.56-$4.14
4,000 "	3.50- 3.61	3.28- 4.39	3.17- 3.75	3.26- 3.55	2.45- 2.56	2.24- 3.35	2.10- 2.68	2.22- 2.51	2.09- 2.56	2.32- 2.79	2.24- 2.82	2.81- 3.39
5,000 "	2.87- 2.98	2.84- 3.95	2.67- 3.25	2.70- 2.99	2.03- 2.14	2.01- 3.12	1.82- 2.40	1.87- 2.16	1.79- 2.26	1.96- 2.43	1.91- 2.49	2.37- 2.95
6,000 "	-	-	-	-	-	-	-	-	-	1.72- 2.19	1.69- 2.27	2.08- 2.66
9,000 "	-	-	-	-	-	-	-	-	-	1.44- 1.91	1.44- 2.02	1.70- 2.28
18,000 "	-	-	-	-	-	-	-	-	-	-	-	1.23- 1.81
Average cost per bale by volumes delivered to Lubbock: 4/												
3,000 bales	$4.61	$4.55	$4.28	$4.34	$3.20	$3.16	$2.87	$2.95	$2.84	$3.13	$3.06	$3.84
4,000 "	3.55	3.81	3.45	3.40	2.50	2.77	2.38	2.36	2.31	2.54	2.52	3.09
5,000 "	2.92	3.37	2.95	2.84	2.08	2.54	2.10	2.01	2.01	2.18	2.19	2.65
6,000 "	-	-	-	-	-	-	-	-	-	1.94	1.97	2.36
9,000 "	-	-	-	-	-	-	-	-	-	1.66	1.72	1.98
18,000 "	-	-	-	-	-	-	-	-	-	-	-	1.51

1/ See preceding page for building and equipment systems included in eacb combination.
2/ Three men required per shift on 6,000 bales or less, and 4 men per shift on 9,000 bales.
3/ Three men required per shift on 6,000 bales or less, 4 men on 9,000 bales, and 5.5 men on 18,000 bales.
4/ Costs for aampler, sample analysis, bur disposal, twine or wire, and bagging and tie losses are not included. Estimated coats of wiring and starters are included.

for hay balers were not included. Interest on investments in receiving stations was not included, except for comparisons of costs shown, in table 1. The inclusion of interest would have improved comparative position of stations with low investments.

Cost estimates indicate around $1 a bale higher cost for gin press packages than for hay baler packages. As stated above, these estimates do not include loss on bagging and ties for gin press packages or for cost of wire or twine for hay balers. If interest on investments in packaging equipment were included, the comparative position of hay balers would be further improved.

The capacity of automatic hay balers was assumed at rates somewhat below rated capacities for hay, as actual capacity on seed cotton is not available. The capacity of gin press was included in estimates at 10 bales (20-bale size packages) an hour, although this was at about a 50 percent higher rate than realized in practice during peak week at high speed gins surveyed in 1962. Capacities of both gin presses and hay balers on seed cotton should be verified.

Increased extraction of burs and trash naturally reduced hauling costs. However, to obtain a larger percentage of extraction requires increased investments in extraction equipment and additional labor. Costs for these tended to offset reductions in hauling costs. At locations close to Lubbock, very little extraction is needed on some combinations, while more distant points can justify higher rates of extraction.

If higher proportions of trash are extracted at receiving stations, less processing will be done at the central gin. However, larger investments will be needed for equipment used for only a short time--similar to present problems of cotton gins. The problem of hiring satisfactory labor will also tend to increase.

On the basis of estimates in this study, extraction of 50 to 75 percent of burs and trash may be most economical as a general practice for receiving stations and hauling to Lubbock.

Larger volumes, or larger numbers of bales, lowered costs rapidly for any given combination of receiving station equipment. The extent of these reductions varied considerably among receiving stations. For example, in combination 1 average costs declined $1.69 ($4.61 to $2.92) a bale compared with a decline of only $0.62 ($3.16 to $2.54) in Combination 6 when volumes increased from 3,000 to 5,000 bales a year.

Of the 12 combinations, Combination #10 provides the best compromise on flexibility of capacity and comparatively low costs. In uncertain situations, flexibility in capacity may be highly desirable. Combination #10 may be modified so that the second boll opening cylinder and second stick machine could be installed easily and quickly if needed.

On 18,000-bale volumes, combination #12 has a lower cost than that for two or more units of any other combinations with capacity totaling 18,000 bales. But costs of combination #12 are high on low volumes. Two units of combination #10 may be preferred to combination #12, if a capacity of less than 36 bales an hour is needed for a period of time.

Combinations #7 and #8 have up to 26 cents a bale lower costs than Combination #10, on 3,000, 4,000, and 5,000 bales. Combination #5 also compares favorably with Combination #10 on part of the costs, but differences are small. If more than 5,000 bales capacity should be needed, Combination #10 would have substantial advantage in costs, compared with two units of Combinations #5, #7, or #8.

Other combinations of equipment for seed cotton receiving stations could be assembled from data in a later section of this report, or from other sources, and other assumptions could be used.

Procedures Used for Finding Costs

Prices obtained on equipment were adjusted for known omissions and are shown in table 3. They include installation costs and, therefore, represent investments required.

An example of how overhead costs were determined for an item of equipment -- a standard gin unloader -- costing $4,915 is as follows:

Cost item	Amount
Taxes ($0.55 per $100 of investment)	$ 27.03
Insurance ($0.45 per $100 on 80% investment)	17.69
Depreciation (7% of investment)	344.05
Repairs (3% of investment)	147.45
Total	$536.22

Tax, insurance, and depreciation rates used in estimating overhead costs were the same as those developed from survey data on gins in the Lubbock area, and used in FCS Marketing Research Report No. 640, Costs of Ginning Cotton by Cooperatives at Single-Gin and Two-Gin Plants, California and Texas, 1962. Repairs were not considered a fixed overhead cost, but were estimated at a fixed rate for this study. These costs were all based on original investment. They amounted to 10.91 percent of that investment. Percentages could be used as a short cut for determining overhead at these or other rates.

An example of how power costs were determined for the standard gin unloader follow:

75 hp motor x 75% = 56.25 kwh an hour
56.25 kwh @ 2¢ = $1.125 per hour
$1.125 ÷ 10 bales an hour = 11.25¢ a bale

Overhead and power costs for this unloader, based on these procedures, is shown in table 4. The same procedure was then applied to determine overhead and power costs for other items of equipment. The resulting costs per bale are shown in table 5.

Procedures used for determining labor costs are shown in tables 6 and 7. Wage rates of $1.50 an hour were used, and total wages for a season of 30 days were calculated, table 6. The cost per bale for labor was then calculated as shown in table 7.

An example of how costs were combined is shown in table 8. This procedure was used for finding costs as shown in table 2. And it was also used in tables 10 to 15.

Table 9 shows estimated costs per cwt. of hauling seed cotton to Lubbock. Extraction of from 5 to 90 percent of trash and burs at receiving stations left from 85 to 808 pounds per bale to be hauled to Lubbock. Based on the estimated average cost of hauling, it would cost 15 cents a bale to haul 85 pounds, but $1.44 to haul 808 pounds.

Costs of hauling seed cotton to Lubbock were estimated to be the same per 100 pounds as charged in 1962 on bales and the seed from the bales, as shown in table 9. These costs per 100 pounds were then used to compute costs of hauling trash and burs to Lubbock that were not extracted as listed in table 2.

Costs of Operating Equipment Systems

Cost of operating single items or combinations of items that would perform various functions at receiving stations for equal or different volumes are shown in tables 10 through 15. Equipment performing a given function is called a system.

This analysis was made to facilitate comparisons of costs for different equipment that might be used for a given function. It also makes it easy to determine the effects on costs when adding or omitting equipment for a function.

For example, table 15 shows, among other things, estimated operating costs for 4 different packaging systems. Costs vary widely, depending on whether gin presses or hay balers are used, even when the same volume per year is handled. In Packaging System #1, operating costs totaled $1.14 a bale compared with only 31 cents a bale in System #2, when 5,000 bales a year are handled. Most of the difference in these costs are attributed to smaller investment and smaller labor requirements in System #2.

Table 3.--Pricesof equipment used in estimating costs for seed cotton receiving stations, Lubbock area of Texas, 1963. 1/

Item No.	Item	Price
1	Standard gin unloader (#45-50 fan, 75 hp motor, 2 track type telescopes, 2 Y-valves, and piping)	$ 4,915
2	Rock catcher and green boll trap and 2 hp motor	832
3	Airline cleaner, (52") with 10 hp motor	3,344
4	Separator (63") plus 5 hp motor	2,407
5	Feed control, 10 hp motor	4,114
6	Full tower drier, piping, fans plus 60 hp motor, and heater	7,547
7	Incline cleaner (72") 7 cylinders, 10 hp motor	5,979
8	Bur machine (14'), 15 hp motor	10,754
9	Stick machine (72"), 10 hp motor	4,074
10	Gin press, tramper, press turner, 2 hp, 20 hp, and 25 hp, motors	22,134
11	Condenser with 2 hp motor	3,297
12	Boll opening cylinder and 5 hp motor	1,000
13	Buildings:	
	(a) 25'x25'x40' eave height and floor @ $3.60 a sq. yd.	5,135
	(b) 25'x25'x30' " " " " " " " "	4,510
	(c) 25'x25'x20' " " " " " " " "	3,365
	(d) 25'x40'x20' " " " " " " " "	4,225
14	Combination cleaner and unloader, 10 bale size motor, plus 40 hp motor, fan and separator	12,000
15	Combination cleaner and unloader, largest size motor (18-bale capacity) 40 hp motor, fan, and separator	13,500
16	Pneumatic unloader, plus another telescope, small size	5,750
17	Pneumatic unloader, plus another telescope, medium "	7,200
18	Pneumatic unloader, plus another telescope, large "	10,000
19	Hay baler, 16-ton size	3,500
20	Hay baler, 20-ton size	5,000

1/ Prices estimated for electric motors, starters, wiring and installation were as follows:

2 hp.	- $150	25 hp.	- $675
5 "	- 207	40 "	- 750
10 "	- 275	60 "	- 975
15 "	- 460	75 "	- 1,150
20 "	- 600		

Table 4.--Overhead and power costs for standard gin unloader by selected volumes handled annually

Bales handled	Overhead	Power	Total	Cost per bale
		Dollars		Cents
3,000	536.22	337.50	873.72	29.1
4,000	536.22	450.00	986.22	24.7
5,000	536.22	562.50	1,098.72	22.0
6,000	536.22	675.00	1,211.22	20.2

Table 5.--Estimated overhead and power costs combined for items of seed cotton receiving station equipment in table 2, on selected volumes, Lubbock area of Texas, 1963. 1/

Item no.	Item	Cost per bale for bales received annually of				
		3,000	4,000	5,000	6,000	9,000
				Cents		
1	Standard gin unloader	29.1	24.7	22.0	2/20.2	-
2	Rock catcher	3.3	2.6	2.1	2/ 1.8	2/1.3
3	Airline cleaner	13.7	10.6	8.8	2/ 7.6	-
4	Separator	9.5	7.3	6.0	2/ 5.1	-
5	Feed control	16.5	12.7	10.5	2/ 9.0	2/6.2
6	Drier (including estimated fuel @ 20¢ a bale)	56.4	49.6	45.5	-	-
7	Incline cleaner	23.2	17.8	14.5	2/12.5	-
8	Bur machine, 14'	41.4	31.6	25.7	2/21.8	-
9	Stick machine	16.3	12.6	10.4	2/ 8.9	-
10	Gin bale press	81.5	61.4	49.3	-	-
11	Condenser	12.3	9.3	7.5	2/ 6.3	2/4.3
12	Boll opening cylinder	4.4	3.5	2.9	3/ 2.6	-
13	Buildings: 4/					
	(a) 25'x25'x40'	13.5	10.2	8.1	6.8	4.5
	(b) 25'x25'x30'	11.9	8.9	7.1	5.9	4.0
	(c) 25'x25'x20'	8.9	6.7	5.3	4.4	3.0
	(d) 25'x40'x20'	11.1	8.4	6.7	5.6	3.7
14	Combination cleaner & unloader, small	54.9	44.0	37.4	3/33.1	-
15	Combination cleaner & unloader, large	59.1	46.8	39.5	34.5	26.4
16	Pneumatic unloader, small	29.2	23.9	20.8	3/18.7	-
17	Pneumatic unloader, medium	32.9	26.3	22.4	19.8	15.4
18	Pneumatic unloader, large 5/	40.7	31.6	26.2	22.6	16.5
19	Hay baler, 16-ton size	14.6	11.4	9.4	8.2	-
20	Hay baler, 20-ton size	19.4	14.9	12.2	10.3	7.3

1/ Includes estimated cost of overhead and electric power @ 2¢ per kwh, with kwh per hour equal to 75 percent of motor horsepower except on gin press and hay balers. Gin press is an exception and was estimated to use 0.5 kwh per bale based on bale press study, Mkt. Res. Rpt. 386. Power on hay balers was adjusted to 50 percent of other motors, because motors are loaded only part of time, similar to those on gin press. Labor is not included in this table.

2/ Exceeds capacity indicated but may be adequate.

3/ Exceeds 10 bales per hour, but may be adequate.

4/ Depreciation rate of 5 percent and repairs of 2 percent used on buildings.

5/ On 18,000 bales, cost estimated @ 10.4 cents a bale.

Table 6.--Cost of labor for 30-day season at seed cotton receiving stations, on selected number of men per shift, Lubbock area of Texas, 1963. 1/

Number of men per shift 2/	Labor on 2 shifts (24 hours a day)	Labor in 30 days (of 24 hours)	Wage rate per hour 3/	Total wages for 2 shifts
	Hours	Hours		
0.5	12.0	360	$1.50	$ 540
1.0	24.0	720	1.50	1,080
1.5	36.0	1,080	1.50	1,620
2.0	48.0	1,440	1.50	2,160
2.5	60.0	1,800	1.50	2,700
3.0	72.0	2,160	1.50	3,240

1/ Seed cotton receiving stations were estimated to receive seed cotton for 21 days and nights. But labor to get stations started, to clean up when season is over, and loss of labor during rainy spells was assumed to require the additional labor.
2/ Shifts of 12 hours.
3/ Wage rate is based on survey of single and two-gin multiple plants in Lubbock area in 1962. Rate includes cost of social security and workmen's compensation insurance.

Table 7.--Cost of labor per bale for 30-day season at seed cotton receiving stations, for selected numbers of men a shift and selected volumes, Lubbock area, 1963

Number of men per shift 1/	Total wages for 30-day season	Cost per bale for bales received annually of --					
		3,000	4,000	5,000	6,000	9,000	18,000
		Cents					
0.5	$ 540.00	18.0	13.5	10.8	9.0	6.0	3.0
1.0	1,080.00	36.0	27.0	21.6	18.0	12.0	6.0
1.5	1,620.00	54.0	40.5	32.4	27.0	18.0	9.0
2.0	2,160.00	72.0	54.0	43.2	36.0	24.0	12.0
2.5	2,700.00	90.0	67.5	54.0	45.0	30.0	15.0
3.0	3,240.00	108.0	81.0	64.8	54.0	36.0	18.0

1/ Wages are for 2 shifts of 12 hours each (per day and night) for season of 30 days and nights.

Table 8.--Example of procedure followed in accumulating costs on seed cotton receiving station systems in tables 10 to 15. 1/

Item	Cost per bale for bales handled annually of --			
	3,000	4,000	5,000	6,000
	Cents			
Unloading system (table 5, item 1)	29.1	24.7	22.0	20.2
Separator (table 5, item 4)	9.5	7.3	6.0	5.1
Labor -- 1.5 men a shift (table 7)	54.0	40.5	32.4	27.0
Total (table 10, column 1)	92.6	72.5	60.4	52.3

1/ This example applies to Unloading System in column 1 of table 10.

Table 9.--Estimated costs per 100 pounds, of hauling seed cotton from seed receiving stations on High Plains to Lubbock, Texas, 1963. 1/

Item	Lowest (1)	Highest (2)	Average (3)
Ginned bales (500 pounds)	$0.75	$1.50	2/ $1.125
Cottonseed (per ton)	1.80	4.40	3/ 3.00
Rate per 100 pounds on cottonseed	0.09	0.22	0.15
Cost of hauling 850 pounds of cottonseed to Lubbock	0.765	1.87	1.275
Cost of hauling lint and seed from a gin bale to Lubbock (500+850 = 1,350 pounds)	1.515	3.37	2.40
Cost per 100 pounds	0.1122	0.2496	0.1778

1/ Calculations based on 1962 rates.
2/ Average of lowest and highest charges.
3/ Reported average.

Table 10.--Estimated costs of operating unloading systems for seed cotton receiving stations, Lubbock area of Texas, 1963. 1/

Item	Unloading system			
	#1	#2	#3	#4
Equipment included (from table 3)	(1) Standard gin unloader (4) Separator	(16) Pneumatic unloader, small	(17) Pneumatic unloader, medium	(18) Pneumatic unloader, large
Investment (from table 3)	$7,322	$5,750	$7,200	$10,000
Capacity (bales an hour)	10.0	10.0	18.0	36.0
No. of men a shift	1.5	1.5	2/1.5-2.0	3/1.5-3.0
Operating costs per bale per season (from tables 5&7):				
3,000 bales	92.6¢	83.2¢	86.9¢	94.7¢
4,000 "	72.5	64.6	66.8	72.1
5,000 "	60.4	53.2	54.8	58.6
6,000 "	4/ 52.3	4/45.7	46.8	49.4
9,000 "	-	-	39.4	40.5
18,000 "	-	-	-	28.4

1/ The combination cleaner and unloader also unloads seed cotton, but since it also cleans and is reported to do some extraction, that equipment is listed separately in table 13.

2/ On 6,000 bales and less, 1.5 men were included; on 9,000 bales, 2.0 men were included.

3/ On 6,000 bales or less, 1.5 men included per shift; on 9,000 bales, 2.0 men included per shift; and on 18,000 bales, 3.0 men included per shift.

4/ Exceeds 10.0 bales per hour, but may be adequate.

Table 11.--Estimated costs of operating airline cleaning systems for seed cotton receiving stations, Lubbock area of Texas, 1963

Item	Airline cleaning system	
	#1	#2
Equipment included (from table 3)	(2) Rock catcher	(3) Airline cleaner
Investment (from table 3)	$832	$3,344
Capacity (bales per hour)	10.0	10.0
Number of men per shift	None	None
Operating costs per bale per season (from table 5):		
3,000 bales	3.3¢	13.7¢
4,000 "	2.6	10.6
5,000 "	2.1	8.8
6,000 "	1.8	7.6
9,000 "	1.3	-

Table 12.--Estimated operating costs of bur extracting systems for seed cotton receiving stations, Lubbock area of Texas, 1963.

Item	Extracting equipment system				
	#1	#2	#3	#4	#5
Equipment included (from table 3)	(7) Incline cleaner, (8) Bur machine, 14' (9) Stick machine	(7) Incline cleaner, (8) Bur machine, 14'	(12) Boll opening cylinder, (9) Stick machine	(12) two boll opening cylinders, (9) two stick machines	(12) four boll opening cylinders, (9) four stick machines
Investment (from table 3)	$20,807	$16,733	$ 5,074	$10,148	$20,296
Capacity (bales an hour	10.0	10.0	10.0	18.0	36.0
Estimated percentage of trash extracted	90.0	75.0	50.0	50.0	50.0
Number of men per shift	1.0	0.5	0.5	1/0.5 & 1.0	1/0.5 & 1.0
Operating costs per bale, per season (from tables 5 and 7):					
3,000 bales	116.9¢	82.6¢	38.7¢	57.1¢	94.1¢
4,000 "	89.0	62.9	29.6	43.4	71.1
5,000 "	72.2	51.0	24.1	35.2	57.3
6,000 "	61.2	43.3	20.5	29.7	48.2
9,000 "	-	-	-	26.6	38.9
18,000 "	-	-	-	-	20.6

1/ Men per shift used in making estimates were 0.5 man on 3,000 through 6,000 bales, and 1.0 man on 9,000 bales and over.

Table 13.--Estimated operating costs of combination cleaner and unloading systems for seed cotton receiving stations, Lubbock area of Texas, 1963.

Item	Cleaning and unloading system	
	#1	#2
Equipment included (from table 3)	(14) Combined cleaner and unloader (small), (4) separator and fan motor	(15) Combined cleaner and unloader (large), (4) separator and fan motor
Investment (from table 3)	$12,000	$13,500
Capacity (bales per hour)	10.0	18.0
Estimated percentage of trash extracted	1/ 30.0	1/ 30.0
Number of men a shift	1.5	2/ 1.5 & 2.0
Operating costs per bale, per season (from tables 5 and 7):		
3,000 bales	108.9¢	113.1¢
4,000 "	84.5	87.3
5,000 "	69.8	71.9
6,000 "	60.1	61.5
9,000 "	-	50.4

1/ Bur and trash extraction was estimated at 30 percent, but when combined with boll opening cylinder and stick machine, as in combinations 10 and 11 of table 2, extraction was assumed to be 60 percent. Extraction percentage rates decline with increased extraction, as with lint cleaners.

2/ 1.5 men on 6,000 bales or less; 2.0 men on 9,000 bales.

Table 14.--Estimated operating costs of feeding control systems for seed cotton receiving stations, Lubbock area of Texas, 1963.

Item	Feeding control system		
	#1	#2	#3
Equipment included (from table 3)	(5) Feed control with 10 hp motor	(11) Condenser with 2 hp motor	Two feed controls with 10 hp motors
Investment (from table 3)	$4,114	1/$3,297	$8,228
Capacity (bales per hour)	2/ 10.0 to 18.0	2/ 10.0 to 18.0	10.0 to 36.0
Number of men a shift	None 3/	None 3/	None 3/
Operating cost per bale, per season (from table 5): 4/			
3,000 bales	16.5¢	12.3¢	31.4¢
4,000 "	12.7	9.3	23.9
5,000 "	10.5	7.5	19.5
6,000 "	9.0	6.3	16.5
9,000 "	6.2	4.3	11.5
18,000 "	-	-	6.5

1/ An additional fan and motor, costing around $1,600, would be needed in addition to condenser for some combinations where cotton is cleaned and/or extracted.
2/ Capacities of 6,000 and 9,000 bales might be handled.
3/ It was assumed that press men could handle this equipment.
4/ Costs given under #3 are not shown in table 5, but were calculated in the same way. They are less than twice those under #1 because power costs remained the same per bale.

Table 15.--Estimated operating costs of seed cotton packaging systems for seed cotton receiving stations, Lubbock area of Texas, 1963.

Item	Packaging system				
	#1	#2	#3	#4	#5
Equipment included (from table 3)	(10) Gin press	(19) Hay baler, 16-ton size	(20) Hay baler, 20-ton size	Two 20-ton per hour hay balers	Round bale press 1/
Investment (from table 3)	$22,134	$3,500	$5,000	$10,000	
Capacity (bales of lint per hour)	10.0	10.0	18.0	36.0	
Number of men a shift	3.0	1.0	1.0	2/ 1.0 to 1.5	
Operating costs per bale, per season (from tables 5 & 7):					
3,000 bales	189.5¢	50.6¢	55.4¢	70.3¢	
4,000 "	142.4	38.4	41.9	53.0	
5,000 "	114.1	31.0	33.8	42.7	
6,000 "	-	26.2	28.3	37.4	
9,000 "	-	-	19.3	25.4	
18,000 "	-	-	-	16.3	

1/ Data not available.
2/ One man included for 9,000 bales or less and 1.5 men included for 18,000 bales.

BLENDING

The practice of handlind cotton through receiving stations and central gins has an important additional advantage--that of permitting extensive blending at low cost. Blending may increase the value of cotton by about $5 a bale. However, data are not available on the actual value that extensive blending may add to value of cotton in the Lubbock area. The market may have to be tested by sales to determine the extent of such values.

The major source of values arising from blending would be the increased uniformity of homogenious mixtures of cotton. Other sources would be that specific requirements of mills could be met more accurately, and that two-sided bales could be eliminated.

Cotton mills have practiced blending for many years and often go to considerable expense to make blends. One cotton merchandising firm has been blending baled cotton in recent years.

Blending of seed cotton at gins likely accounted for the "unusually good reputation" of south Brazilian cotton, reported by Herrmann in 1940.1/ And it likely also accounted for Sao Paulo cotton being found more uniform than from any State in the United States, according to Spiegel.2/

1/ Herrmann, Omer W. South Brazil, New Land of Cotton, U. S. Dept. of Agri., FCA, Circular C-117, May 1948. p. 1.

2/ Spiegel, Henry W., The Brazilian Economy, p. 118, footnote, 1949, Richard D. Irwin, Inc., 1818 Ridge Road, Homewood, Illinois.

ASSUMPTIONS ON WHICH ESTIMATED COSTS WERE BASED

Several assumptions and special procedures were necessary for developing estimated costs. They had important effects on the analysis. Because of this, major assumptions and procedures are listed as follows:

1. Cost of loss on bagging and ties for gin press packages and costs of twine or wire for hay balers were not included in estimated costs as data were not available.

2. Capacity of gin press used was 10 bales of lint per hour (20-bale size packages of seed cotton). This number of packages (20) is substantially more than gins turned out continuously in bales at any of the gins surveyed in the single-multiple gin study. Although 10 bales (20-bale size packages) were used for gin presses, this capacity seems questionable.

3. Hay balers were assumed to have capacities for cotton somewhat less than for hay (10 bales on 16-ton hay baler and 18 bales on 20-ton hay baler). Actual capacities of hay balers on seed cotton should be determined.

4. Interest on investment was not included as an expense on receiving stations, except in table 1.

5. Top capacity of receiving stations was limited to 21 days, of 24 hours, but labor was included for 30 days, of 24 hours, to allow for rainy weather and other losses of time.

6. Some items of equipment were used for capacities of beyond 10 bales of seed cotton per hour, which was somewhat beyond capacities indicated.

7. Electricity was assumed to cost 2.0 cents per kwh for receiving stations.

8. Extraction percentages for trash were assumed but may or may not be accurate. Ninety percent was maximum extraction used since feeders over stands, huller ribs of stands, and lint cleaners extract trash also.

9. Driers were not included in any combinations. If used they would add an estimated 45 to 55 cents a bale for each drier used.

10. It was assumed that feed controls could be used to feed packaging equipment, either gin bale presses or hay balers, but they may not be necessary.

11. Gravity flow of seed cotton after unloading, rather than movement by air, was assumed for most combinations.

12. Gravity flow of cotton likely means a different sampling mechanism, such as a rotating arm, with trough, to catch and dump sample segments below feed control, or a trap door where seed cotton slides down an incline. A sample divider might be used to reduce samples that are too large.

13. Costs for sampler, and of sample analysis, were not included in costs, except in allowance in table 1.

14. Airline cleaners were omitted in most combinations, but rock catchers were included except on combined cleaner and unloader. It was assumed that strippers removed most of the sand.

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